DOCUMENT RESUME

ED 326 874 CS 212 586

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TITLE Markers of Cognitive Change during the Transition to Conventional Literacy.
PUB DATE 90
NOTE 63p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS Child Language; *Cognitive Development; Grade 1; Invented Spelling; Kindergarten; Knowledge Level; *Language Processing; Learning Processes; *Literacy; Primary Education; *Reading Writing Relationship; Writing Attitudes; Writing Processes
IDENTIFIERS *Emergent Literacy; Reading Behavior; Story Writing

ABSTRACT

This study examined transitional knowledge during literacy development, hypothesizing that there are times when the integration of reading and writing knowledges into literacy knowledges is problematic for children because these knowledges are out of synch with one another. Data were gathered from 46 kindergarten pupils, each of whom wrote and read back six stories (during individual writing sessions over a 2-year period) which were analyzed for developmental patterns. Results revealed two mixed-level relationships between the sophistication of children's narrative compositions and their readings of those compositions: "Low level writing/high level reading" and "High level writing/low level reading." The first type represents the relationship of pairing stories composed of letter strings with written-language-like readings while the second represents the relationship of pairing compositions consisting of invented spellings and conventional orthography with readings judged to be oral or written monologues. Findings suggest that while there might not be a clear cut boundary between emergent and conventional literacy, there does seem to be a time in development when a greater than average amount of cognitive reorganization occurs that functions to integrate production and comprehension knowledges and thereby facilitates the advent of conventional literacy. (Three tables of data and five figures containing samples of children's story writing are included; 48 references and 2 appendixes are attached.) (KEH)

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Markers of Cognitive Change During the Transition to Conventional Literacy

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Abstract

In the present study I applied theoretical reasoning concerning transitional knowledge to a problem in literacy development. The impetus for the study was the idea that there are times in development when integrating reading and writing knowledges into literacy knowledges is problematic for children because these knowledges are out of synch with one another. Two mixed-level relationships between the sophistication of children's narrative compositions and their readings of those compositions were hypothesized as indices of transitional knowledge or knowledge reorganization. These relationships consisted of writing behaviors and products that seemed much more sophisticated than children's readings of them belied, and vice-versa. A longitudinal data set composed of 46 children each of whom composed six stories over a two-year period was examined using these indices to select children presumed to be in transition and then to analyze the developmental patterns exhibited by these children. Detecting such children has critical implications for classroom research and instruction. These implications are discussed.

Transitional Knowledge in Early Literacy Development

One of the most exciting milestones in development and learning for children (as well as for their parents and teachers) is when they become conventionally literate, when they can read and write like "grown-ups." While on the surface it often seems that this milestone is reached almost miraculously, it is a complex process and one that is not well understood. While a good deal of research has been done in the areas of both emergent literacy and early conventional literacy, much less research has explored the transitional period between the two. Specifically, very little work has addressed the issue of how children actually make the transition from emergent to conventional writing and reading.

In the transitional period between emergent and conventional literacy, children integrate many constructs about reading and writing. This integrative process is complex, multi-levelled, dynamic, and recursive, and while engaged in it, children continually develop, test, and refine their naive theories about reading and writing (Feirrero & Teberosky, 1982). At any give time, children may hold different, even competing, knowledges[1] about various aspects of reading and writing.

During early literacy development generally, and particularly during the transition to conventional literacy, children integrate many knowledges about reading and writing. Research in emergent literacy[2] (e.g., Clay, 1979; Dyson, 1986, 1988; Ferreiro, 1986;

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[1] I use the plural term (knowledges) rather than the singular one (knowledge), following Sulzby (1983, 1985a), in order to emphasize that children acquire many bits of information about reading and writing which are not necessarily related to one another as a systematic knowledge set like they might be for the adult. Indeed, it appears that a fundamental developmental task during early literacy development is the organization of these bits of information into some kind of system or theory about literacy.

[2] The term "emergent literacy" is a derivative of the term "emergent reading" which was introduced by Marie Clay (1966, 1967). In her pioneering work in New Zealand and Australia, Clay demonstrated that preschoolers actually engage in many important reading behaviors that go unrecognized as such (e.g., visual sensitivity to letter and word forms, letter/sound relationships, sight vocabulary, appropriate directionality, conventional or quasi-conventional story structure, genre distinction, and speech/writing correspondence). The term emergent literacy is used here to refer to the constellation of reading and writing

Feirrero & Teberosky,1982; Harste, Woodward, & Burke, 1984; Hiebert, 1981; Sulzby, 1981, 1985a, 1985b, 1986; Teale, 1986a; for reviews, see Mason & Allen, 1986; Sulzby & Teale, in press; Teale & Sulzby, 1986) suggests that the ontogenesis of literacy in children does not proceed in a lock-step fashion and is not best characterized as having a smooth developmental trajectory. As children construct their literacy systems, they make many stops and starts, experience apparent regressions, and arrive at non-conventional constructions that seem peculiar and erroneous to literate adults. What appear to be errors or low level performances, however, are often evidence of learning in progress and can be viewed in much the same way that we have come to view errors in noun and verb inflection in spoken language development (foots for feet; buyed for bought). Systematic regularizations such as these occur because children seek regularity and coherence in language that would make it more logical.

Linguistic and cognitive progress has been hypothesized to occur only in the presence of cognitive conflict, when unassimilable object(s) of knowledge urge learners to modify their assimilation schemata. These disturbances or conflicting situations probably reflect either discordant interactions between the cognitive structures of the child and environmental tasks (external disequilibrium) or discordant relationships among knowledges held by the child (internal disequilibrium). They seem to occur in systematic ways and at particular occasions in the ontogenesis of cognitive processes including literacy (Ferreiro & Teberosky, 1982; Piaget, 1977). Several researchers have regarded these discordant interactions as important and productive ontogenetic events and have developed constructs such as stage variation (Turiel, 1966, 1969), structural mixture (Strauss, 1972), and level mixture (Snyder & Feldman, 1977) to account for them.[1] A body of literature

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behaviors exhibited by children prior to the time that they are considered conventional readers and writers, along with the concepts underlying those behaviors.

[1]Since I focus on indices of transitional knowledge in early literacy development throughout this article, I have chosen to use the term mixed-level relationships consistently to refer to the particular indices I discuss. This term is a derivative of Snyder and Feldman's term: level mixture. I have chosen a derivative of their term because the general

has grown out of research in this area which might be drawn together under the rubric of a literature on transitional knowledge.

Transitional Knowledge

Transitional knowledge can be thought about both descriptively and as a mechanism of cognitive change. As a description of cognition, transitional knowledge characterizes children's understanding of certain concepts or conceptual sets at particular times during development. As the term suggests, transitional knowledge indicates knowledge in flux, in the process of becoming different in some way. Children operating with transitional knowledge are presumed to be in the process of reorganizing their knowledge structures, and they often display behaviors indicative of more than one developmental level. Yet transitional knowledge might also be instrumental in ontogenetic change. The cognitive conflict that seems inherent to transitional knowledge might instigate the cognitive reorganization that characterizes the state itself. Or it might be that transitional knowledge represents what Vygotsky described as wide rather than narrow zones of proximal development (e.g., Rogoff & Wertsch, 1985; Vygotsky, 1962, 1978). That is, transitional knowledge might facilitate the achievement of a qualitatively different level of conceptual understanding.

Theoretically, transitional knowledge appears to reflect a fundamental inconsistency or lack of integration in the system(s) of constructs or sets of constructs developed and used by children (e.g., Keil, 1986; Wilkinson, 1982). Moreover, children in transition are hypothesized to be more likely to be ready to progress to new levels of understanding of particular concepts than children with more stable or integrated knowledge systems.

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construct of level mixture as described by Snyder and Feldman seems to capture best what the data disclose. They argue that level mixture has theoretical import because of its relation to internal disequilibrium or to discrepancies or inconsistencies within the child's cognitive system. It reflects general instability within the system, and the degree of instability provides a useful measure of readiness for developmental change (Feldman, 1980, p. 62). While it is likely that both internal and external disequilibrium contribute to transitional knowledge, the behaviors and writing products discussed in this paper seem to reflect aspects of internal disequilibrium.

However, proving that a child holds unintegrated levels of understanding of particular concepts or knowledge sets has been problematic to say the least (Kessen, 1984).

Operationally, two particularly important dimensions of transitional knowledge are relevant to the present research. First, children functioning with transitional knowledge appear to be particularly receptive to instruction (Strauss, 1972; Vygotsky, 1962, 1978). Intervention studies have been used to test this hypothesis (e.g., Perry, 1989; Strauss, 1972). Second, it has been suggested that children operating with transitional knowledge are on the threshold of significant reorganizations of their cognitive structures (Piaget, 1967; Beilin, 1965; Strauss, 1972). Inconsistencies in responses on problem solving tasks have been used by some researchers as evidence for imminent reorganization (e.g., Wilkinson, 1982). Other researchers have argued that discordant or mixed level performances within the same or similar tasks may be viewed as identifiable indices of transitional knowledge (Church & Goldin-Meadow, 1986; Feldman, 1980; McDermott, in press; Perry, Church, & Goldin-Meadow, 1988; Siegler, 1976).

The present study represents an attempt to test a hypothesized index or set of indices of transitional knowledge in the domain of literacy development. To my knowledge, this has not been done before. Particularly relevant to this study is the work of Goldin-Meadow and her colleagues. These researchers took advantage of two different communication modalities--speech and gesture--to gain a more complete view of the mental representations of particular concepts (conservation and mathematical equivalence) that seemed to be held by children. They documented mismatches between verbal and gestural responses on problem-solving tasks and demonstrated the relationships between these mismatches and transitional knowledge. Discordance between the information conveyed in these two modalities proved to be a powerful index of imminent cognitive change, albeit a post hoc one.

In the present study the basic rationale used by Goldin-Meadow and her colleagues was employed, and a similar index of transitional knowledge was hypothesized, one more

appropriate for the domain of early literacy acquisition. Instead of hypothesizing that gesture/speech mismatches index transitional knowledge in early literacy development (though some evidence exists for this hypothesis), I hypothesized that mismatches between writing and reading or production and comprehension would mark such a transitional state. More specifically, I hypothesized that children who encoded their ideas in phonetic-based but non-conventional written language (i.e., with invented spellings) but had difficulty decoding what they had encoded would be in transition. Similarly, I hypothesized that children who encoded their ideas in non-phonetic based written language (i.e., composed with non-phonetic letter strings) but who read back those strings with abundant structures and features of literate discourse (i.e., as if they were reading from a well-formed written text) would likewise be in transition. These indices are described in more detail below. Before proceeding further with a discussion of these indices, however, a short review of relevant research from emergent literacy is in order.

Emergent Literacy

Three programs of research in emergent literacy are particularly relevant to the present study: those of Anne Dyson, Emilia Ferriero, and Elizabeth Sulzby. These programs are discussed briefly in the following few paragraphs.

Ann Dyson's research program. Drawing upon Vygotsky's (1978) work on the prehistory of written language, Dyson (1982, 1983, 1986, 1988, 1989) has explored the relationships between the various interrelated symbolic systems (talk, drawing, writing) that are instrumental in children's communicative development. She has also investigated the connections between children's social relationships and their written texts. In particular, Dyson has demonstrated the ways in which children invent worlds with talk, drawing, and social interactions and how these worlds relate to the ones created in children's writing. Dyson has shown that children encounter problems when they try to translate the imagined worlds that they have created in talk, drawing, and social experiences into writing--"problems created by the differences in dimensions in time and space and by

the unidimensional nature of written language, which demands words for gestures and qualities of voice" (1986, p. 407). In addition, she has documented differences in the ways children weave together pictures, speech, and social experiences into their writing and has suggested that the resources, constraints, and tensions created by different symbolic systems vary in identifiable ways for different children. From her findings, Dyson has concluded that rather than viewing writing development as the increased mastery of cognitive and linguistic strategies (as many researchers have), it should be viewed as a function of the increased integration of various social and symbolic worlds. This integration "can help authors create coherence in their worlds beyond the texts" (Dyson, 1988, p. 387).

Thus, Dyson has illustrated that to understand emergent literacy, researchers cannot examine texts alone. Rather, they must examine children's texts in relation to the many expressive, communicative, and creative activities engaged in by children.

The importance of Dyson's work to this research is her discovery and documentation of the transitions and tensions experienced by children as they deal simultaneously with talk, drawing, social experience, and print. Dyson has demonstrated the importance of transitions and tensions that appear to be present across these social and symbolic systems. I intend to demonstrate the importance of transitions and tensions within the single symbolic system of written language.[1] More specifically, I will demonstrate the importance of the tensions and transitions between writing (production) and reading (comprehension) as children become conventionally literate.

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[1]I recognize that written language is not a completely autonomous symbol system and that it is related in integral ways to other symbol systems--drawing and speaking, for example. However, I wish to make analytic distinctions among these systems for the purpose of developing a workable hypothesis about indices of transitional knowledge that appear to be a function of the integration of reading and writing. This appears to me to be a reasonable thing to do and one that does not imply the independence of literacy from other communicative modes. I acknowledge that it may be possible to develop hypotheses about other indices of transition that specifically utilize relationships among two or more symbolic systems.

Emilia Ferreiro's research program. Ferreiro (Ferreiro, 1978, 1984, 1985, 1986; Ferreiro and Teberosky, 1982; Ferreiro & Gomez-Palacio, 1982) has developed a Piagetian-like stage theory of literacy acquisition. She has been particularly interested in the constructive aspects of literacy development, characterized by questions such as: (1) What is the connection among the various elements of written language--letters, words, parts of speech, sentences? (2) Are there systematic rules of comprehension and production explored and constructed by children learning to read and write? (3) What do letters and words represent from the child's point of view?

Ferreiro argues very strongly that learning is a process of construction. Children "assimilate to understand" but they "create in order to assimilate" (Ferreiro, 1984, p.155). Children work through solutions to the cognitive problems they face as they try to understand the relationships between speech and reading and writing. Their constructs are usually logical even though they do not accord with the conventional logic of written language. Children operate according to certain assumptions or hypotheses about reading, writing, and literacy which they construct as they interact with literacy materials. These assumptions function as anticipatory schemata. They are adjusted or reformulated when they fail to be useful or turn out to be inadequate. This process of hypothesis generation and testing continues as children continue to interact with written language. Eventually, constructs evolve into conventional ones in most instances of normal development.

However, children also experience problems along the way as one assumption or set of assumptions conflicts with another. At these times their literacy knowledges seem more unstable than at other times. Implicitly, and sometimes explicitly, children express that they know two or more things about written language which do not fit with each other. The following reactions of children faced with sentences which have been transformed so that the subjects and the objects of the sentences have been switched illustrates this point:

> Maximo (5yrs.): "It's wrong. It's all turned around. It says the dog chased the cat, but it's wrong."

> Ximena (4yrs.): "It says the same but different things. The same but with different things."
>
> (Ferreiro & Teberosky, 1982, p. 136)

These children know that something has changed, but they are not sure what has changed. Nor are they sure about the semantic consequences of the change. "They remain indecisive between the observed similarities (the letters are the same, and so, the meaning must be the same) and the differences they have also observed (the order is not the same, and so the meaning must have changed)." (Feirrero & Teberosky, 1982, p. 136).

Ferreiro notes that these unstable periods of development are extremely important, often marking the onset of a whole new kind of knowledge organization within these children as well as their increased receptivity to instruction. Ferreiro's descriptions of these "disturbances" or "conflicting situations" are particularly relevant to the present research which seeks to discover and to describe similar kinds of disturbances between children's writing and their attempts to read it.

Elizabeth Sulzby's research program. Sulzby (1981, 1985a, 1985b, 1986; Sulzby, Barnhart & Hieshima, 1989) has emphasized the importance of examining the relationships between children's writing and their readings of that writing in order to understand literacy development In this regard, she has reported that it is fairly common for children to compose stories using lower level writing forms (e.g., drawing, scribble, letter strings) but to read their writing with a reading intonation and with many structures and features of written language. When one hears such readings without seeing the writing from which it derives, one is led to believe that the child is reading from conventional print.

For the purposes of analyzing relationships between writing and reading, Sulzby has developed an emergent literacy classification system which allows one to categorize the forms of writing and reading used by children. Writing forms include drawing, scribble, letter strings, several levels of invented spelling, and conventional orthography. Reading forms include labelling and commenting, dialogic storytelling, oral and written language like monologues, aspectual reading, reading with strategies imbalanced, and independent or

conventional reading. As they are used in this article, terms relevant to our argument will be defined. Appendix 1 contains definitions and examples of all of the forms for the reader who would like to study them in advance.

Sulzby's suggestions about the importance of studying writing in relation to reading and her classification scheme are especially relevant to the present study. While Sulzby's classification scheme is not intended to be a stage theory of emergent literacy, the forms of writing and rereading are arranged more or less hierarchically from lower level forms to higher level ones. As such, the classification scheme allows us to induce mixed-level relationships between writing and reading forms used by children in particular task situations. In other words, a relationship comprised of a lower level writing form paired with a higher level reading form or vice versa could be judged to be a mixed-level relationship. An example of such a relationship might be a story composed in full invented spellings which is read as an oral monologue without the assistance of text cues or with a significantly degraded performance when depending on text cues. An oral monologue is defined by Sulzby as a story delivered in a storytelling intonation (in contrast with a reading intonation) which does not utilize print. Such a reading employs syntax and phrasing appropriate to face-to-face dialogue even though the child tells it as a monologue (Sulzby, 1985a, p.468).

Method

Hypothesized Indices of Transitional Knowledge

Two particular relationships between writing and reading were posited as potential indices of transitional knowledge in emergent literacy. In both cases the writing was comprised of print.[1] Drawing and scribble were not considered because I posited that

[1] From an emergent literacy perspective, all forms of graphic representation produced in response to a request to write are honored as "writing." These can include drawing and scribble in addition to various forms of writing that utilizes letters from the alphabet.

some attempt to use letters was important to the transition to conventional literacy which was the focus of this study.

The first hypothesized index was writing via random and patterned letter strings paired with reading in a written monologue style or by naming letters. An example of a letter string is BUPLOUBUPFG. A written monologue is a reading that does not utilize the print but that exhibits many structural features of written language, such as many aspects of a well formed story grammar, explicit discourse referentiality, and reading intonation. Naming letters is self-descriptive. The child utters the names of the letters that he or she has produced.[1] From the point of view of the Sulzby classification scheme, this first hypothesized index is composed of the two lowest forms of writing with letters from the alphabet paired with one or the other of two relatively high forms of reading.[2]

The second hypothesized index was writing using invented spellings and conventional orthography paired with reading in an oral monologue style, a written monologue style, or a mix between the two. In all cases, children either did not exhibit the utilization of text cues, or they began reading using text cues but abandoned this strategy early on in the reading. An invented spelling for the word went might be yhet. An oral monologue is distinguished from a written monologue in that it employs speaking rather than reading intonation, uses less explicit referential terms, and tends to accord less with story grammar rules. According to the Sulzby classification scheme, this second index is composed of the highest forms of writing (invented spelling and conventional spelling) paired with two relatively low forms of reading: the two most common reading forms that do not utilize or are not governed by available print.

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[1] See Appendix 1 for more elaborate descriptions of these forms of writing and reading.
[2] A written monologue is the highest form of reading on this scale that is not associated with actually reading from phonetic-based print. While naming letters is one of the lower forms of reading from print, it represents a conceptual advance over not actually utilizing print.

The first mixed-level relationship represents a writing form combined with a reading form which is more advanced than one would expect. The second relationship represents a form of writing more advanced than the reading that accompanies it. In the discussions below I refer to these respectively as "low level writing/high level reading" and "high level writing/low-level reading."[1]

Subjects

The subjects for this study were 46 children, each of whom wrote and read back six stories for us during individual writing sessions over a two-year period. These sessions occurred in the autumn, winter, and spring of both kindergarten and first grade. The 46 children in this study constitutes a subset of the subjects from a larger longitudinal study of children's writing development (Sulzby, Barnhart, & Hieshima, 1989). Subjects for the larger study were 123 kindergarten children. Except for the 46 children in this study, the remainder of these 123 children were not followed through the first grade. The data for the larger study were collected during the 1985-86 and the 1986-87 school years in a large suburban school district near Chicago, Illinois.

Story Elicitation Procedure

During all of the individual session data collections, each child was taken to a quiet place in the hallway where he or she wrote a story and read it back to an adult experimenter. All sessions were audiotaped, and during the sessions, experimenters took notes on writing and reading behaviors. In the first individual writing session, each child was asked to write a story about how s/he learned to ride a big wheel or other child vehicle. In subsequent sessions, each was asked to write a story about something scary or exciting that had happened since the examiner had last visited. The examiner's directions were

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[1] The Sulzby classification scheme is not meant to represent a stage theory of writing and reading development. Moreover, it is a nominal rather than an ordinal scale. Given these constraints, decisions about mixed-level relationships were based not on relative distance on the scale but on logical discordances or dissimilarities from an adult perspective.

specifically worded not to cue any particular form of writing. First, the child was asked to tell what he or she was going to write about; then the adult said, "Now, write your story."

When the child finished composing, the examiner requested that the child read it: " Now read your story to make sure that it is just the way you want it to be." If the child did not point to the text during the first reading, he or she was asked: "Read your story again and this time point while you read." (If the child had pointed during the first reading, the examiner simply asked for a second reading and did not mention pointing.) This procedure was included for two reasons. First, it helped to insure that children focused on the texts so that reliable determinations could be made about whether or not children were actually reading what they had composed. This was necessary since one of the hypothesized indices of transitional knowledge involved children's difficulty comprehending what they had produced. Second, it allowed for a check on story stability across readings. Story stability was a variable examined in the larger study and was determined from examining typed transcripts. Stories judged to be stable were ones in which, across readings, all clauses remained semantically equivalent and in which no semantically-equivalent clauses were omitted, added, or disordered. For example, "I went to the park with my mom," was considered semantically equivalent to "My mom and I walked to the park" but not semantically equivalent to "I went to the park with my mom and played."

Coding and Analysis

All writing and reading samples were coded using a revised version of Sulzby's "Forms of Writing and Rereading" checklist (see Appendix 2). Interrater agreement for forms of writing ranged from 88%-93% across the six data collection sessions. For forms of reading, interrater agreement ranged from 80%-91%. Agreement for stability was 98%; the few disagreements involved judgments about the semantic equivalence of lexical items and were easily reconciled.

The completed coding sheets were examined for the presence of the hypothesized mixed-level relationships between writing and reading. All of the samples that exhibited

these relationships were recoded. Interrater agreement this time was 92%-100% for forms of writing and 90%-98% for forms of reading. All discrepancies in judging forms of reading were a function of determinations about the relative oral or written quality of readings that were not governed by print.

The recoded samples containing mixed-level relationships were then compared to each other for precise similarity. Finally, for each child who exhibited at least one mixed-level relationship, the writing and reading samples from sessions prior to and following the target sessions were examined to detect developmental patterns.

Results

Before presenting the results of the entire study, I present a detailed analysis of four examples--two representing each mixed-level relationship described above. The first two (Brian and Pat) represent the relationship of pairing stories composed of letter strings with written-language-like readings, or "Low level writing/high level reading." The second two examples (Ulana and Hillary) represent the relationship of pairing compositions consisting of invented spellings and conventional orthography with readings judged to be oral or written monologues, or "High level writing/low level reading."

Examples

Brian (age 6; 2). Brian had been asked to "tell" his story to the examiner prior to being asked to write it, as had all the children. In telling the story, Brian recounted the events of his uncle's birthday party in an excited oral language fashion. While writing the story (shown in Figure 1), Brian commented on the spellings of certain words and acted as if he were sounding out some of them. In addition, he read parts of his composition repeatedly as he went along. In spite of these behaviors, however, there appear to be no invented spellings in his text.

Insert Figure 1 about here

Brian read his text as follows:

First reading: "In Thursday night...uh...yesterday night at my uncle's birthday party, my sister threw a cake at my Uncle Ron's face.

Second reading: "Yesterday night, on my uncle's birthday, my sister threw a cake at my uncle.

Brian pointed to his text during each reading, tracking the print from left to right. He ended each reading as his finger reached the end of the print he had composed. Although not verbatim, his story remained stable across the two readings. Brian delivered his story as if he were reading it; that is, he employed the intonation and structural features of written language.

In the session prior to this one, Brian had written his story using letter strings and had read it by naming letters. In the session following this one, he composed his story using invented spellings and conventional orthography. He read his story with a style between aspectual/strategic and conventional. Although Brian composed his story with letter strings in the session I have considered to contain a mixed-level relationship, it may be that, in this session, he was on the threshold of coordinating enough literacy knowledges to use invented spelling strategies and to write in invented spellings. He might well have done so if asked to perform a writing task less complex than composing extended discourse. Indeed, some researchers have noted that it is quite common for children to use higher level writing forms for lower level writing tasks (e.g., word lists) and, conversely to use lower level forms for higher level tasks (e.g., stories) (Barnhart, 1986; Sulzby, Barnhart, & Hieshima, 1989). Thus assessing children's writing performance with just a single task can be misleading.

Pat (age 5; 11). When asked what he wanted to write his story about, Pat responded "Um...my brother's [Doug's] baseball game" with no further elaboration. Pat uttered many letter sounds while composing his story (Figure 2). The examiner noted that Pat seemed to be sounding out the words of his composition. In particular she thought

that MB might be syllabic invented spelling for My Brother and that DG might be intermediate invented spelling for Doug. The examiner probed Pat extensively to try to determine whether or not he had composed using invented spellings. In spite of her suspicion, the results of her probing yielded no positive evidence that he had done so.

Insert Figure 2 about here

For example, when The examiner asked Pat what he was doing when he was making sounds, he replied: " I am trying to pick the letters up, trying to sound them out. B and E." When she asked Pat where it said baseball game in his story, he pointed to the end of the first line twice (EEEB) and to the entire first line once (MB EEEB). Similarly, once when she asked him where it said Doug, Pat pointed to the entire last line (DGB). On other occasions when she asked him the same question, Pat pointed to other letter strings in the text.

Despite the results of the examiner's probing, it appeared that Pat was close to coordinating enough different aspects of literacy to use invented spellings and perhaps even conventional orthography. As with Brian, Pat might have produced some phonetic-based text if he had been asked to perform a writing task less complex than composing extended discourse.

Pat read his story as follows:

First reading: "My brother's baseball game. They were the Expos. Um... Carlo hit a home run. Doug caught the ball at first."

Second reading: "My brother's baseball game. They were the Expos. Carlo hit a home run. Doug caught the ball at first base, and he was out."

Pat pointed to his story as he read it, coordinating his voice and his finger to finish at the same time. He delivered his story as if he were reading it conventionally. The written language structures and markers he employed include a title, a setting, explicit

character references, and written language intonation. Because of the extra clause added during the second reading, Pat's story was judged as not stable, yet his two versions are very similar.

In the two sessions prior to this one, Pat composed his stories and read them in exactly the same fashion as he composed and read this one: letter strings paired with written monologue. However, his stories were stable across readings in the two sessions before this one. In all three sessions he attended to print as he read his stories. In the session following this one, Pat composed his story using full invented spellings and conventional orthography. He read his story conventionally.

Ulana (age 5; 5). When Ulana was asked to tell her story to the examiner prior to writing, she told it in a reading intonation. She began writing her story (Figure 3) immediately after receiving instructions to do so, and she wrote very rapidly, without voicing. She composed her story using advanced invented spellings (KQLaeK for "calling" and ikseted for "excited"), some mixed forms (Neelk ton for "new toy" may include partial invented spellings) and conventional orthography (MoM, IS, For, a).

Insert Figure 3 about here

When she was not asked to point to her text, Ulana's readings of her story appeared to be consistent with her advanced invented/conventional writing. However, she did not seem to use the print she had composed, and she delivered her story in an oral language style. When she was asked to point to her text, however, her readings seemed to be less consistent with her writing, as a quick comparison of her readings will attest.

Because her behavior was perplexing to the examiner, Ulana was asked to read her story back four times, alternating reading without pointing and reading with pointing:

First reading: "My mom is calling for a new toy for me. I am so excited."

Second reading: "My mom is so excited. She is buying me a new toy."

Third reading: "My mom is calling for a new toy. I am so excited."

Fourth reading: "My mom is calling for a new toy for me to have."

During the first reading, Ulana was not asked to point to her composition. She began pointing voluntarily in the general direction of the words, but did not track them. During the second reading, Ulana was asked, "Read it again and this time point while you are reading." Her speech did not match the print; in fact, it deteriorated to the extent that it was neither semantically nor syntactically equivalent. Because of this discrepancy, the examiner asked Ulana to read her story a third time, but deliberately did not mention pointing. Ulana did not point voluntarily as she had done in the first reading, but, like the first reading, her speech very closely approximated the print. When asked to read the fourth time, with pointing, she departed from the written composition, though not as drastically as in the second reading.

Because Ulana did not utilize print unless asked to do so and because she was hindered rather than aided by attending more closely to the print, her readings were judged to be written monologues (or, according to one coder, aspectual readings with a comprehension focus). Ulana's reading pattern here is similar to that of other children observed by Sulzby and her colleagues. Her readings more closely matched the print when she was not required to attend closely to it. At certain points in development, whether attending closely to print via pointing is an aid or a detriment to children has proved to be an important diagnostic. Explaining why it is an aid or a detriment, however, is somewhat perplexing. I will return to a general discussion of some possible explanations later. In Ulana's case, when she is asked to focus on the text's phonetic elements, her reading strategy is disrupted and she becomes disfluent. One possible explanation might be that because so much cognitive effort has gone into encoding her ideas that she has few cognitive resources left for the reading task and relies on her memory of her text to read it. An alternative to this explanation might be that Ulana

focused almost exclusively on intra-word knowledge during the production task, knowledge that was less useful in the comprehension task.

In the two sessions prior to the one in which this story was written, Ulana composed her stories using random and patterned letter strings, and she read them in a written language style. In other words, the relationship between her writing and reading was much like the one demonstrated by Brian and Pat. In the session after this one, Ulana composed her story using advanced invented spellings and conventional orthography. She read it in a style somewhere between strategic and conventional reading (only the story's brevity prevents us from being confident that she was reading conventionally). Her readings were exactly the same across instances. The adult probed her knowledge of individual words and word boundaries by repeatedly asking her to locate and to identify words in her text. She had almost no trouble with this task. In the two sessions following that one, she continued to compose using advanced invented spellings and conventional orthography, and she read her stories conventionally, with ease, and with stability across readings.

Hillary (age 5; 5). Hillary provided one of the most interesting examples of discord between writing and reading that I found in the sample. Her story (along with what she uttered while composing it) appears in Figure 4.

Insert Figure 4 about here

Hillary began to write her story immediately after the examiner asked her to do so. She interrupted her writing after every three or four letters, looked around the room or at the examiner, and appeared to be thinking about what to do next. She often seemed to be reading certain parts of her story over and over, and she uttered certain words and sounds in isolation while appearing to be writing letters that corresponded to them. She did not ask specific questions about letter-sound relationships, spelling, or any other aspect of

writing, although she frequently engaged the examiner in conversation. Finally, during a portion of the composing process Hillary hummed along as the rest of her class sang a song.

When asked to read after composing, Hillary read her story silently. As she finished her silent reading, she uttered, "I forgot to write ice cream cones." She then added the final line of her story: RRQ. After Hillary's silent reading, the examiner asked her to read her story aloud two times. The second time, the examiner included a request for pointing. Hillary read the story aloud to the examiner two times in exactly the same manner:

First reading: "When I see a parade, I think of ice cream cones."

Second reading: "When I see a parade, I think of ice cream cones."

It did not appear as though she was utilizing the print during the first reading. Her reading did not reflect the section of her text constituted by ILYKR which she had repeatedly read as "I like" while composing. Both coders judged Hillary's reading to be an oral/written mix monologue.

During the second reading, Hillary was asked to point to her composition. She began by pointing at the beginning of the second line. The way that she matched her speech with the segments of text she pointed to is noted in Figure 5.

Insert Figure 5 about here

Of particular interest is the fact that she read parts of her text repeatedly while composing it, but when asked to point to what she was reading during the reading task, she neither read her composition as she had read parts of it while composing nor did she match her speech to what appeared to be very reasonable intermediate invented spellings.

In the session prior to this one Hillary had been absent. In the session following this one she composed her story in advanced invented spellings and conventional

orthography and included a drawing to illustrate her story. Hillary read her story with strategies imbalanced, the level on the Sulzby (1985a) scale that directly precedes independent reading.

The relationship between writing and reading exhibited by Ulana and Hillary in the target sessions-- "High-level writing/Low-level reading"-- does, indeed, seem to index transitional knowledge operative just prior to the advent of relatively stable conventional literacy behaviors. Both Hillary and Ulana have been shown to exhibit this pattern a few months before demonstrating conventional reading and writing. However, why children have difficulty decoding what they have encoded remains somewhat puzzling. This point is taken up to some extent in the discussion section.

General results

Besides Brian, Pat, Ulana, and Hillary, many children in this study exhibited evidence that they were functioning with transitional emergent literacy knowledge. Table 1 shows the frequencies of the two major patterns put forth as indices of such knowledge.

Insert Table 1 about here

Table 2 displays minor patterns which seem to be related to the two primary patterns. While these appeared much less frequently, they are important to subsequent analyses of development prior to and following the primary patterns, and I have included them for this reason.

Insert Table 2 about here

Thirty-two different children produced a total of 65 instances of at least one of the writing and reading relationships in Tables 1 and 2 across the six data collection sessions. Most instances of the first transitional pattern shown in Table 1 occurred during kindergarten (27/30 of a total of 139 stories). Most instances of the second pattern occurred during the period between the spring of the kindergarten year and the fall of first grade (20/24 of 184 total stories). Results based on each of these patterns (and the related patterns in Table 2) are presented below.

Low level writing/high level reading. Of the 32 stories composed using letter strings and read back in alwritten language-like way, 19 different children wrote a total of 30 stories and read them in a written monologue style. The other two stories composed of letter strings were read by naming letters. To determine whether or not children exhibiting this low level writing/high level reading pattern were, indeed, ready to reorganize their literacy knowledge structures, their writing and reading behaviors in the target sessions were compared with those behaviors in the subsequent data collection session. These subsequent sessions occurred approximately three months after the target sessions. One would predict that many of these children would demonstrate more advanced literacy skills in the subsequent session. Of the 30 children who exhibited the transitional pattern in the target sessions, 26 were present in the subsequent data collection sessions and produced stories that could be used for analysis.

In the comparison, children were judged as significantly more advanced who composed their stories in invented and conventional spelling and read them with attention to print. Half of the 26 children in this group improved using this performance criterion.

To test the hypothesis that the children who improved were operating with transitional knowledge and that the mixed-level relationship characterized as "Low level writing/high level reading" indexed their transitional status, they were compared with children in the data set who had composed using the same writing form but who had read their stories as oral rather than written monologues. Relationships comprised of letter

strings paired with oral monologues were judges as "similar-level," whereas letter strings paired with written monologues or naming letters were judged as "mixed-level."

The comparison between these two groups of children consisted of seeing whether or not children exhibiting mixed-level relationships in one session improved more by the following session than children exhibiting similar-level relationships in a set of matched sessions. The criterion for improved performance was as follows: Children were judged to be significantly more advanced who wrote their stories using invented spellings or conventional orthography and read their stories attending to the print.

The results of this second comparison are are shown in Table 3.

Insert Table 3 about here

As the table indicates, a higher percentage of mixed-level children demonstrated improvement than did similar-level children. Results were not statistically significant ($\chi 2(1) = 1.6$; $p < .10$), yet they do suggest that this particular mixed-level relationship may be a good index of transitional knowledge based on the operational definition that children in transition are on the threshold of reorganizing their conceptual schemas in significant ways. Recall that there was a three month delay between data collection sessions. A good deal of cognitive reorganization could have occurred for children in both groups during that time. If mixed-level performances do index the advent of cognitive reorganization, a comparison between these two groups might have yielded significant differences had the data collection sessions been closer together temporally.

A minor pattern related to Low level writing/high level reading. Two children each composed one story each using letter strings and then read their stories by naming the letters in the strings. Neither of these children read the strings exactly the same way each time (treated as being equivalent to not stable). Both children looked at the print while reading. These two cases are interesting and important. While one might predict that it

would be quite common for children to compose using letter strings and to read their compositions by naming the letters in those strings, it is much more common for children to compose in letter strings and to read them as oral or written monologues. Naming letters, then, seems to mark an increased awareness of the role of print in reading and, thus, a more advanced level of reading understanding relative to writing understanding. This idea receives support from the fact that many children who have spontaneously read their letter strings as oral or written monologues, later refuse to read their letter string stories, saying that they do not know how to read or that they did not write anything. If they consent to read their stories after such print-based refusals, they often read by naming letters.

Interestingly, both of the children who displayed this pattern which seems related to the more general "low level writing/high level reading" pattern improved considerably in the subsequent data collection session. Both children composed with invented spellings in this session and produced "strategies imbalanced" readings of their compositions.

High level writing/low level reading. The children judged to be in transition according to this relationship between writing and reading composed phonetic-based texts and read their stories in an oral-monologue or a written-monologue style, paying little or no attention to the print that they had composed. Moreover, when asked to attend more closely to the print, these children either ignored the request or produced very disfluent, even different, readings. There were 16 children in this group who composed a total of 24 stories of this sort (see Table 1).

To test the hypothesis that children exhibiting this "high level writing/low level reading" pattern were, indeed, ready to reorganize their literacy knowledge structures, their writing and reading behaviors in the target sessions were compared to those behaviors in the subsequent data collection session. Of the 24 children present in the target sessions, 21 were present in the next data collection session and produced stories that could be used for analysis.

In the comparison, children were judged to be significantly more advanced if they composed their stories in invented and conventional spellings and read them conventionally (though not necessarily completely fluently). Forty-eight percent of the children in this group improved using this performance criterion. None of the children regressed. Unlike the group of children who produced the first mixed-level relationship that I discussed, an appropriate similar-level comparison group could not be found for this mixed-level group.

Minor patterns related to High level writing/low level reading. In addition to the group just discussed, a second group of children composed phonetic-based texts but did not read the texts conventionally. These children, who are represented in Table 2, wrote stories using invented and conventional spellings and read them aspectually/strategically. It is also important to note that none of these children produced degraded readings when asked to point while reading. Eight children each provided one example of this pattern. This relationship seems related to the "high writing/low reading relationship," perhaps following it quite closely for some children. Indeed, the children who exhibited this pattern seemed to have synchronized production and comprehension knowledges and strategies somewhat better than the children who demonstrated the "high writing/low reading relationship." Finally, this slightly more advanced pattern seems extremely important--marking a time in development when reading knowledges and writing knowledges seem to converge and be integrated into literacy knowledges.

I think it would be wrong to categorize stories written with invented and conventional spellings and read aspectually/strategically as mixed-level. Indeed, it makes intuitive and logical sense for stories composed in an invented spellings/conventional mix to be read aspectually or with strategies imbalanced. The level of understanding underlying the writing seems more or less equivalent to the level of understanding underlying the reading. Yet , at the same time, it seems a bit odd for children to generate reasonable, even conventional, written language cuing systems and not to use these systems to facilitate reading. Deciding which of these explanations is more plausible (or providing additional

alternatives) is difficult at this stage in the research. More cases will be required to do that, as well as an adjustment to the research design to insure more frequent data collection. Notwithstanding this explanatory problem, however, it seems reasonable to suggest that children exhibiting this pattern are slightly more advanced developmentally than children exhibiting the "high writing/low reading" pattern.

This suggestion was tested in a preliminary way with the data at hand. I compared the groups of children who, in the target sessions, demonstrated either the "high writing/low reading relationship" or the related (but slightly more advanced) relationship. The comparison between these two groups consisted of seeing whether or not children exhibiting slightly more advanced knowledges about the relationships between reading and writing improved more by the following session than children exhibiting the mixed-level relationship characterized as "high level writing/low level reading." Of the 24 children present in the target sessions who demonstrated the mixed-level relationship, 21 were present in the subsequent sessions and produced stories that could be used for analysis. Of the eight children present in the target sessions who exhibited the more advanced writing/reading relationship, six were present in the subsequent sessions and produced stories that could be analyzed.

Children were considered to have improved if they produced stories in the subsequent sessions that were composed in invented and conventional spelling and read conventionally (though not perfectly fluently). Forty-eight percent of the mixed-level children improved in the subsequent sessions, and eighty-three percent of the children in the other group improved using this criteria. These results are not surprising, and support the suggestion that children who initially read their stories aspectually or with strategies imbalanced were more advanced on the continuum between emergent and conventional literacy than were the mixed-level children. We might infer that their knowledges about various aspects of reading and writing were more integrated or organized than those of the mixed-level group. Improvement according to the criterion used meant that the mixed-

level children had to reorganize their literacy knowledges more radically than the other children in order to achieve comparable results in the second or subsequent sessions.

In addition to the two groups of children presented so far who produced phonetic-based texts but did not read them conventionally, one child composed his story in invented spellings and conventional orthography and then read it by naming letters. He did not, however, read the same letters during multiple readings nor did he read them in the same order. This writing/reading relationship presents a nice contrast to the one in which children wrote in letter strings and read those strings by naming letters. In the one relationship, naming letters is a form of reading more advanced than the writing form it accompanies. In the other, naming letters appears to be a less advanced reading form than its companion writing form. It might be that naming letters is a pivotal developmental phenomenon for some children.

Discussion

In this study, two kinds of relationships between writing and reading from that writing were hypothesized as indices of transitional knowledge in early literacy development. They were referred to as "low-level writing/high-level reading" and "high-level writing/low level reading." These indices were described and tested in a preliminary way. In this discussion, I provide commentary on the basic findings of the study. I also relate the findings to other research in early literacy development and to classroom practice.

Finding that children pair a lower level writing form with a higher level reading form is not surprising. In literate cultures such as ours where many children are read to, one would expect that children know a lot about the structural features of stories as well as how stories are read. Despite the prevalence of children's participation in literate activities, "high-level reading/low-level writing" remains a reasonable index of as a transitional knowledge. One might guess that the "levels mixture" between these two aspects might mark the threshold of an important advance in literacy understanding. In particular, one might expect that a more sophisticated understanding of story structure and story reading might "pull along" a less

sophisticated understanding of words and spelling. As I mentioned in the discussions of Pat's and Brian's compositions, children operating with transitional knowledge probably know and can spell many words given simpler task conditions. This capacity seems due, at least in part, to having high level knowledges and strategies with respect to some aspects of literacy.

Finding that children compose narratives using advanced invented spellings and conventional orthography but that these compositions are hardly used during reading, or that that when they are used, they often hinder more than they help is extremely interesting. Within the group of children who exhibited this relationship, those who hardly used their texts are perhaps the most unusual. However, even those who read their stories "aspectually" or with "strategies imbalanced" are interesting considering that they composed the stories.

Children exhibiting this second kind of mixed level relationship between writing and reading seem to possess all of the elements of conventional literacy but not to have integrated those elements into a coherent whole. Watching these children write their stories, it seemed that they put so much effort into micro-level tasks (letter/sound relationships on a word by word basis) that they lost sight of the integration of micro-level structures (letter/sound relationships, memory for certain words) into more macro-level ones (words, phrases, story). Their knowledges and strategies seemed neither well formed enough nor well integrated enough to work together fluidly and flexibly on both the difficult production tasks and comprehension tasks they were asked to do. Given simpler tasks, like writing a list of words, one might guess that these children would have exhibited little mixed-level behavior between the writing and reading tasks.

An alternative explanation is also plausible. Perhaps, as a result of cognitive fatigue, these children simply had difficulty accessing knowledges and strategies that were often available to them. It is possible that these children were cognitively exhausted after composing their stories and did not have sufficient cognitive resources left to select and utilize knowledges and strategies that would allow them to read what they wrote. Indeed, some theorists have proposed that such an explanation for many aspects of concept

development and language acquisition. Many more, however, have argued for the greater plausibility of the first explanation, namely that mixed-level performances result from insufficient integration of various knowledges and strategies.

The fact that this paper has focused on two different indices of transitional knowledge might give the impression that there is stable knowledge and unstable knowledge and that the two are qualitatively different. Moreover, this focus might have given the impression that transitional periods are short in duration and have clear cut boundaries. Both of these possible impressions would, I think, be misleading.

While developmental research in a number of different domains has suggested that children's knowledge of particular concepts does vary in stability (see Siegler, 1986, 1989), stability is probably more accurately conceived as a continuum rather that as a dichotomous variable. Moreover, conceptual development is seldom linear or smooth, a fact that led Piaget to develop the notion of decalage. Children can appear to have (and perhaps do have) both stable and unstable knowledge of particular concepts at roughly the same time in development. Results from the present study suggest that this is true of early literacy development.

While there might not be a clear cut boundary between emergent and conventional literacy, there does seem to be a time in development when a greater than average amount of cognitive reorganization occurs that functions to integrate production and comprehension knowledges and thereby facilitates the advent of conventional literacy. This seemed especially true for the children in this study who exhibited the "high-level writing/low-level reading" relationship. In general, however, findings from this study neither support nor deny this claim. Future studies that follow children more closely as they make the transition from emergent to conventional literacy are needed to determine both common trends and individual differences.

The primary goal of this study was to test the hypothesis that certain mixed-level relationships between children's writing and their reading of that writing appear to index

transitional knowledge in literacy development. Two such mixed-level relationships were described. It was suggested that these relationships might be unique vantage points from which to view literacy development retrospectively and prospectively. The frequency of occurrence (32 of the 46 children) indicated that these relationships between writing and reading are not uncommon in literacy development. These particular writing/reading relationships thus seem to be reliable indices of transitional knowledge and important developmental phenomena. Based on results from a preliminary comparison between the mixed-level children who composed with letter strings and the levels-similar children who composed with letter strings, it appears that transitional knowledge in literacy development may indeed foreshadow conceptual reorganization; if so, it may signal enhanced receptivity to instruction. These interpretations concur those of Ferreiro and Teberosky (1982).

The findings of this study are important for teachers and researchers of emergent literacy for several reasons. To begin with, they reinforce Sulzby's (1985b, 1986; Sulzby, Barnhart, & Hieshima, 1989) insistence on the importance of studying children's writing in relation to their reading from that writing.

The findings of this study also extend those of Ferreiro (1978, 1986; Ferreiro & Teberosky, 1982) who has described transitions in literacy development in terms of competing and contradictory hypotheses about orthographic representation. Transitional knowledge may involve not only conflicting hypotheses children develop about written language per se but also the hypotheses they develop about the processes of reading and writing and the conflicts which might obtain between these hypotheses. Ferreiro (Ferreiro & Teberosky, 1982) mentioned in passing that some children do seem to formulate more advanced hypotheses about reading and others about writing (p.277), but she did not elaborate upon it or describe how conflicts might become manifest.

Conflicts between hypotheses about writing and hypotheses about reading seemed evident in the mixed level performances of the children in this study who, like Brian and Pat, exhibited "low-level writing/high-level reading" relationships. For Brian and Pat,

writing extended discourse seemed to be conceived as producing a graphic representation which resembles those perceived in the environment. Reading seemed to have to do with meaning and the writer's intentions rather than the objective results of writing. It, too, resembled a model with which Brian and Pat are familiar reading. Yet these two hypotheses did not seem to coexist harmoniously in Brian's or Pat's thinking. Their sounding out behaviors while composing paired with the total absence of any phonetic decoding while reading provide evidence for this inference. A sense that meanings are distinguished through differences in signifiers seemed to be developing in Brian's and Pat's knowledge repertoires that might lead to a reorganization of their literacy knowledge structures. As mentioned above, quite a few children who seemed only slightly more advanced than these two either refuse to read their letter strings at a certain point in development or they read them by naming letters. These behaviors appear to reflects a genuine conflict in the conceptual systems of these children. Ostensibly this results in a decrement in performance. Developmentally, however, it seems to mark an advance toward the integration of reading and writing knowledges. In Brian's and Pat's cases, this was borne out. In the follow-up sessions to the target sessions, both were writing with advanced invented spellings and conventional orthography and reading conventionally. Similarly, in the comparison between concordant and discordant children who composed with letter strings, more children exhibiting this "low-level writing/high-level reading" relationship than those demonstrating the "low-level writing/low-level reading" relationship were writing with advanced invented spellings and conventional orthography and reading conventionally in the follow-up session.

For the children like Ulana and Hillary who exhibited the "high-level writing/low-level reading" relationships, it seemed quite clear that during the composing process they recognized that the need to distinguish meanings is expressed through differences in the signifiers. Ulana and Hillary are exemplary in this respect. They utilized letter/sound relationships, and for the most part, represented each speech sound with a grapheme.

During their readings, however, they seemed to be operating with quite a different hypothesis, one much more like Brian's and Pat's wherein meaning and the writer's intention predominate. The conflict between these two hypotheses is reflected in the very different readings produced by these children as a function of whether or not they were explicitly asked to point to their texts while reading them. For Ulana, her performances were degraded when she was asked to point. For Hillary, although she pointed, she began with the second line of print, did not appear to use what appeared to be very reasonable intermediate invented spellings, and her speech did not at all match the units to which she pointed.

The resolution of this conflict was evident in the writing and reading behaviors of both Ulana and Hillary in follow-up sessions. In those sessions, these children read their stories conventionally (or at least very close to conventionally).

These findings suggest at least one more way in which conceptual change occurs during literacy development--attempting to resolve conflicts between the related but different cognitive processes of reading and writing. This makes more explicit and thus extends our understanding of the nature and functions of disturbances or conflicting situations. However, Ferreiro's work as well as the present research demonstrate that much more research is necessary to fully understand the structures and functions of transitional knowledge in literacy development.

The findings of this study also relate to and extend the work of Dyson (1986, 1988, 1989) who discovered that children experience "transitions and tensions" as they deal simultaneously with talk, drawing, and print. In particular, she demonstrated differences in the ways children weave together pictures, speech, and writing, suggesting that the resources, constraints, and tensions created by different semiotic systems vary in identifiable ways for different children. The findings of the present study extend Dyson's work to include not only transitions and tensions across semiotic domains but also within them, or at least within the semiotic domain of literacy. The tensions experienced by

children in transition in this study seemed to be a function of integrating production and comprehension processes of written language.

Home and school literacy experiences can be extremely varied across children (see Teale, 1986a, 1986b). It is quite common for different children to have had much more experience with either reading or writing. Differential experience in reading and writing might be one reason for the existence of the mixed-level relationships I have been discussing. However, the present research suggests that this view is too narrow and non-explanatory. Despite differential home and school literacy experiences, the transitional period described in this study seems to involve active, constructive knowledge reorganization.

Finally, this research suggests that transitional knowledge in literacy development may signal opportune times for instructional intervention. Indeed, research in other domains has demonstrated that children operating with transitional knowledge benefit more from instruction than children who are not (e.g., Church & Goldin-Meadow, 1986; Feldman, 1980; Perry, Church, & Goldin-Meadow, 1988). To confirm this suggestion with respect to emergent literacy, appropriate intervention studies are required. However, we must keep in mind that literacy instruction for young children should probably be quite indirect and play-oriented and should rarely involve direct instruction and formal lessons.

Two caveats about the methods used in this article are in order. First, the large data set from which the data reported here were drawn was designed to obtain a large sample of children's story writing and reading rather than to probe intensively their writing and reading behaviors in individual sessions. The hypotheses about transitional knowledges arose while coding the large data set, rather than prior to collecting it, and they were tested with the data available. Follow-up research is underway to concentrate on the second half of kindergarten and the first half of first grade, where most of the mixed-level relationships reported in this study occurred. This follow-up research involves intensive case studies of children judged to be in transition and includes more metacognitive and metalinguistic

probing about what the children's writing actually represents to them. In addition, all writing and reading sessions are being videotaped so that children's interactions with their texts can be documented more carefully.

Second, the instrument used for measuring emergent literacy development needs further refinement. The low level/high level[1] pairings, which I argue represent mixed level relationships between reading and writing knowledges, resulted from a partitioning of Sulzby's classification schemes based on hours of observation of children's writing and reading performances. As mentioned earlier, the Sulzby scales are nominal rather than ordinal scales. Given this constraint, decisions about mixed-level relationships were based not on relative distance on the scale but on logical discordances or dissimilarities from an adult perspective. We are currently refining the instrument and expect that it will allow more careful measurement of levels of writing and reading in future work.

Even given the current methodology, mixed-level relationships between writing and reading appear to be important emergent literacy phenomena which contribute to our understanding of conceptual structures and conceptual change during early literacy development. Thus, the study extends the work of Dyson, Ferreiro, Sulzby, Teale, and others in understanding the path of early literacy development in young children.

Additionally, this study suggests directions for future work aimed at understanding more thoroughly how mixed-level relationships between writing and reading might be instrumental in facilitating cognitive change during the transition from emergent to conventional literacy. Several plausible hypotheses about mechanisms come to mind. Most developmental psychologists agree that cognitive conflict facilitates conceptual

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[1]In Sulzby's research program we have been careful not to attach high and low level labels to forms and writing and reading prematurely. Yet we operate in our research as if some forms are high and others low. Our caution has to do with the fact that we are not yet ready to make any firm decisions about high and low forms of writing and reading. This is, of course, related to our observation that literacy development does not seem to follow a smooth developmental trajectory.

change. The mixed-level relationships central to this study highlight the potential importance of cognitive conflict between production and comprehension processes as children make the transition from emergent to conventional literacy. Indeed, it i s possible that mixed-level relationships between writing and reading function to alert children (either tacitly or explicitly) to conflicts among their literacy knowledges and behaviors, thus providing an impetus for conflict resolution. In relation to this point, it is important that this conflict occur in a single activity (Perry, Church and Goldin-Meadow, 1988). The conflicting knowledges must be simultaneously represented in order for transition to be facilitated. This supports Sulzby, Barnhart, & Hieshima's (1989) claim that, in order to understand literacy development, children's writing must be studied in relation to their reading of it. Performance discrepancies on distantly related literacy tasks (e.g., writing a story and reading a trade book) might not alert children to conflicts in their literacy knowledges in the same way that the mixed-level performances described in this study might.

Mixed-level relationships between writing and reading might also function as cognitive scaffolds, thereby facilitating cognitive change. Externalizing literacy knowledges in two different modalities--writing and reading--might compel children to reflect upon those knowledges and to reorganize them into a more comprehensive and cohesive system (Karmiloff-Smith, 1985). In this case it would not be cognitive conflict that necessarily propels development but the fact that enough information is externalized to serve as a sort of "mass effect" that leads to the increased decontextualization of mediational means and higher level reasoning about literacy knowledges and strategies (Vygotsky, 1962, 1978; Wertsch, 1985).

Finally, in addition to alerting children themselves to cognitive conflicts, thus providing an impetus for conflict resolution, children's mixed-level performances might alert teachers and parents to the fact that such children are "ready" to make the transition from emergent to conventional literacy. Whether or not they are aware of it, teachers and

parents might recognize mixed-level performances as signs of "cognitive readiness" and provide appropriate scaffolding, instruction or access to developmental opportunities that facilitate cognitive reorganization.

To explore how mixed-level relationships between writing and reading might be instrumental in early literacy development, future research should pursue two directions. First, it should include microgenetic analyses of children who appear to be in transition with particular attention to their linguistic and gestural behavior while composing, reading, and talking about their stories. Second, it should include a focus on teachers' and parents' perceptions of when children are and are not in transition, along with a focus on how adult behaviors change in response to children who display mixed-level performances.

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Table 1.

Major Transitional Patterns

Pattern	N of Stories	Stability		
		Yes	No	DK
Letter strings read as written monologue	30	12	16	2
Invented spellings and conventional orthography read in written or oral monologue style	24	16	6	2

Table 2.

Minor Transitional Patterns

Pattern	N of Stories	Stability		
		Yes	No	DK
Letter strings read by naming letters	2	0	2	0
Invented spellings and conventional orthography read by naming letters	1	0	1	0
Invented spellings and conventional orthography read aspectually/ strategically	8	6	2	0

Table 3.

Comparison of Mixed-Levels and Similar-Levels Relationships

Pattern	Initial N	Improved	Not Improved	% Improved
Mixed Levels	26	13	13	50%
Similar Levels	30	10	20	33%

Figure 1

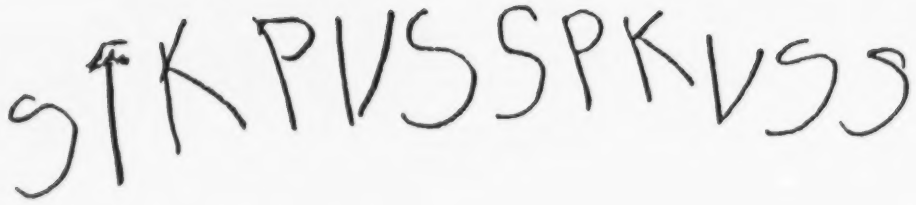


Figure 2

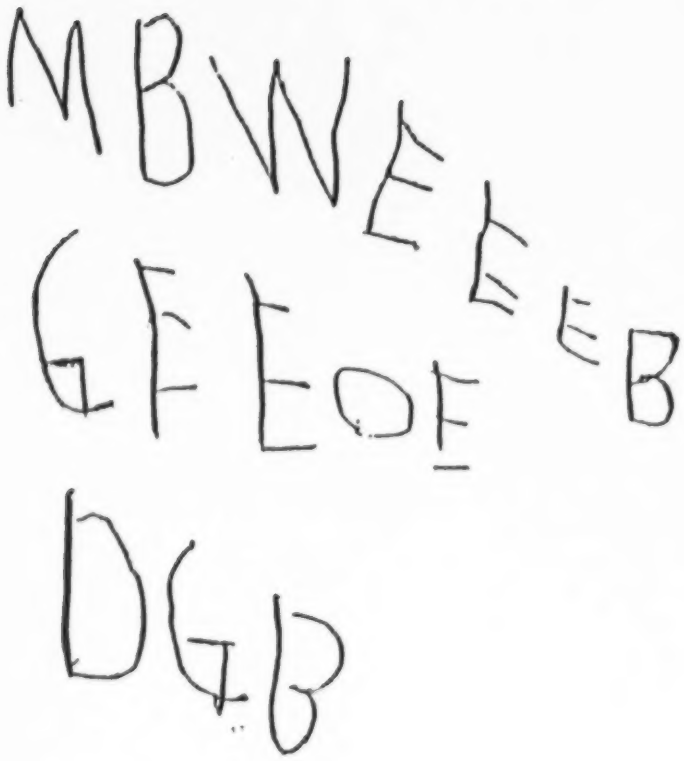


Figure 3

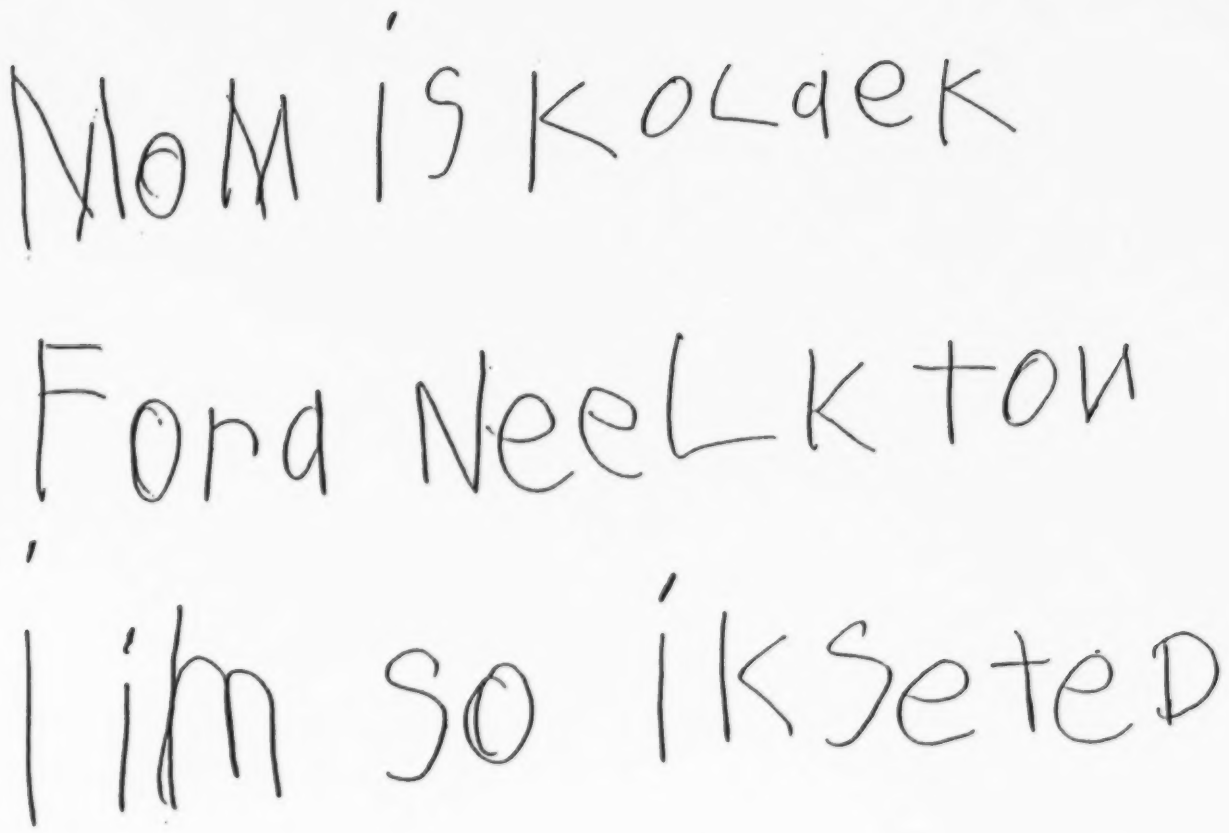
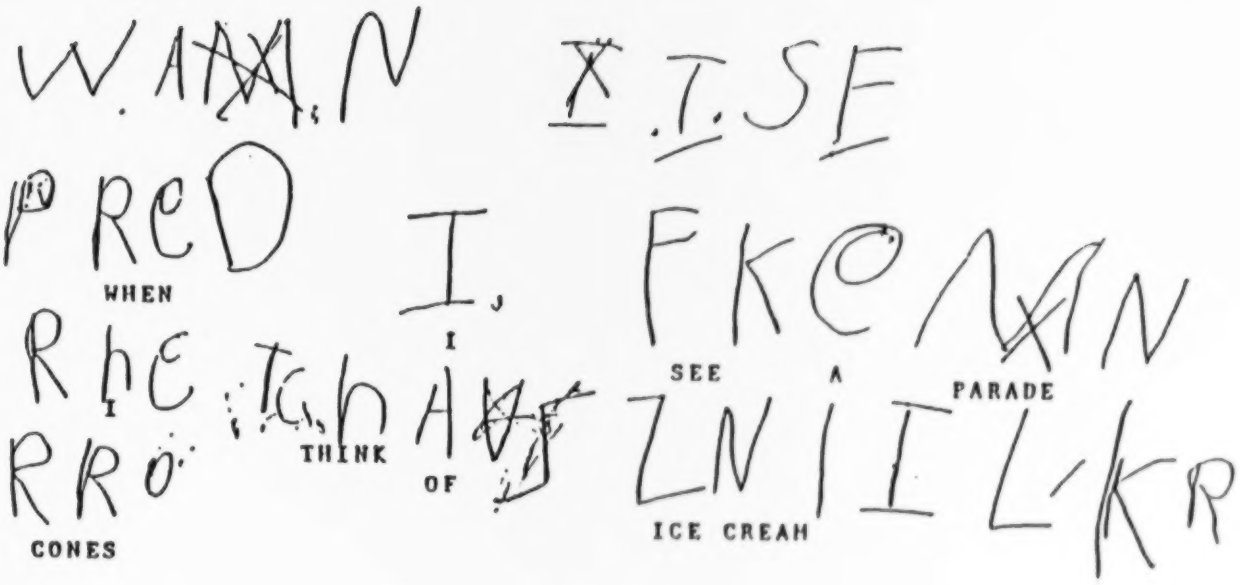


Figure 4

Figure 5



Forms of Writing and Rereading

Example List

Elizabeth Sulzby

Northwestern University, 1985

[This version reflects changes made early in data collection. Some comments are directed toward use of this document with classroom instruction but the majority are addressed to researchers collecting data.]

Following is an example list of the primary forms of writing which we have observed kindergarten children using, along with forms of rereading which we have observed children using with these forms of writing. This example list and the checklist which accompanies it can be used both for research and classroom assessment; the discussion here is primarily addressed to classroom use.

As discussed elsewhere (Sulzby, 1985b), one can only judge the quality of the form of writing by comparing it with the rereading a child uses with it. So-called lower level forms can be used either as low level forms or as the means of performing a higher level task. For example, *scribble* can be used and the child may say, "I didn't write," or "That's my story," or "See, he loves to eat bones and one day he ran away so's nobody couldn't find him and that's all." Or, the child may reread a very formal story with the wording and intonation of written language, even tracing the *scribble* with the finger and making the scribble, finger, and voice end at the same points.

The examples are intended to accompany the "Forms of Writing and Rereading Checklist," to be used in kindergarten classrooms during the 1985-86 school year. This form can be used to keep record of children's progress in writing stories or other forms of connected discourse. (We have not tried it out with other genres such as list writing, letter writing, or direction writing. Notice that the child may write a list when you ask for a story; if so, check "other" and write a note explaining what the child did on the back of the Checklist).

The "Forms of Writing and Rereading Checklist" lists the forms of writing before the forms of rereading. When you use it, you can judge the form of writing by looking at the child's page. Check as many forms as the child uses. That is, the child may use some scribble, some drawing, some syllabic invented spelling, and some conventional writing. Check each one.

You will only be able to judge the rereading after the child has finished. Occasionally, a child uses more than one form; try to decide on one form and, if more than one is needed, explain on the line provided for comments. Similarly, you can only judge whether the child's eyes were on print, not on print, or occasionally on print after the child has completed the rereading. Always be certain to let the child terminate the rereading--when I began using the form in classroom situations, I discovered I had a tendency to say, "Are you done?" rather than wait for the child's signal, perhaps because I was concerned about time.

In this list the rereading forms are listed first because you need to think about each of them as being possible responses with each of the following forms of writing. On the checklist, they are listed second.

Information categories in top left-hand corner are primarily for the Northwestern University research team. We have assigned each teacher a code number. Use initials for the school and for researcher. Classroom means a.m. or p.m. to any special category such as bilingual.

List child's first name and, if possible, age in years and months down left-hand side. It's easiest to list them in the order they come up to read. Please note any absences.

Forms of Rereading

If you are a classroom teacher using this form for instructional purposes, you may want to hear only a few people read each day but may want to keep this checklist to record the forms of daily writing. Then at the end of a cycle, you could put together a composite of the class with a rereading for everyone.

1. Not observed. In some instances, you will not have heard the child reread. (This category refers to classroom teacher use, not research use.)

2. Refusal. Check this if the child says, "I can't," shakes head repeatedly, etc., after you give numerous encouragements and wait a long enough period of time to feel that s/he is not going to attempt to read. If you have checked *refusal* and the child reads later, check the form of the reading and write a brief note to explain the order.

3. "I didn't write." This response is important enough to indicate separately. Check this if the child says, "I didn't write," or the equivalent ("It doesn't say anything," "I didn't," "It's not anything").

4. Labelling/Describing. Check this response if the child labels items (except naming letters) or describes items written or drawn. Examples of labelling include, "A sun," "My mom," "A dog," and describing is simply a fuller statement, "This is a sun," or "That's my daddy." This category is closely tied to *dialogue* but it is usually metalinguistic in nature with varying degrees of sophistication.

5. Dialogue. Check this if the child will only respond if you ask questions, so you have a question/answer response pattern. Or the child initiates a question/answer pattern by techniques such as, "Know what, my dad got me a drum set?" (Adult: "Really?") "Yeah, and it's got three drums and a triangle and I can play it." Also included here are one clause statements that do not fit the labelling/describing category.

6. Oral Monologue. Check this if the child carries the full weight of responding and gives an orally-told story in the intonation and wording of oral language. The story may be about "it" and "he" and "they" without telling what or who these are. It may have sentences run together with "and" and "and then" and you may be in doubt about whether the child meant clauses to be separated or joined as compound sentences. The intonation will be entertaining and flowing, like that expected in oral storytelling. (There must be at least two full clauses to fit this category.)

7. Written Monologue. Check this if the child recites a story that is worded like written language and sounds like written language in intonation. The child may begin with a title and will specify who the people are and what the things in the story are. The story may end with "the end." The intonation may be staccato-like; "Once-upon-a-time-saw-a-monkey." Or it may be both staccato and highly entertaining but sound like an expressive oral reading done by an accomplished reader. (You could close your eyes and almost think the child was reading from print.)

8. Naming Letters. The child makes an important move toward attending to print when s/he "reads" by simply naming the letters s/he has written. Be sure to pause long enough to be

certain that the child is not going to do more than simply name letters or is not going to ask you for assistance. If s/he does that, the behavior may change to a higher or lower category.

9. Aspectual/Strategic Reading. I have taken these terms from children's storybook reading behavior but we have now seen a number of older kindergarteners and first graders use these behaviors. The child may sound out his/her own writing, or may simply read a few words and skip others. Or the child may recite the story while looking at print but not tracking accurately. The child is attending to print but not yet reading conventionally.

10. Conventional. The child is reading from print, conventionally. S/he will probably sound like the *written monologue* category but you will see his or her eyes on print, not that s/he is tracking the print, and will notice evidence that s/he is understanding what is being read.

11. Other. Check this when the rereading does not fit the other categories. Also, write a brief description on the line beneath the child's name, on the back of the page, or elsewhere. The 10 items listed above appear to be the most frequent categories, but they are not all-inclusive.

Forms of Writing

Check all the categories that the child uses. There will typically be more categories of writing than of rereading. Mark a dark bar across the bottom of the box of the predominant writing form.

Please note that some of the categories are related: the two *scribble* categories; the three *letter* categories; and the three *invented spelling* categories. At times, you may not be able to distinguish between the closely-related categories. If so, then make a large X across all those related boxes (one that goes across both scribble boxes or one that goes over all three letter boxes). Make the distinction whenever possible and use the large "X" as a last resort.

(Note: Samples gathered for research studies will be tape-recorded and rated by two judges, independently. Any difficulties in making distinctions under these conditions should be brought to my attention).

1. Drawing. Check this form if the child draws one picture for the entire composition or embeds pictures within other forms of writing. Do not check this form if the child clearly states that the drawing is illustration and not writing. Instead, mark the box with a capital I for *illustration*. The example is one complete drawing used for an entire story (Barnhart & Sulzby, 1984).

[Insert Example 1 here.]

2. Scribble–Wavy. Scribble is a continuous (or continuous with breaks) form without the definition of letters. The scribble may be curvy or pointed in form but there will be no differentiation of shapes. See example (Sulzby & Teale, 1985).

[Insert Example 2 here.]

3. Scribble–Letter-like. This *scribble* is different from the *wavy scribble* because the child is using different forms within the scribble, and these forms have some of the features of letters. In the example shown (Sulzby, unpublished data), the child's scribble has forms that look like lower-case E's, or L's, it has M- or N-like forms, descenders as in a lower-case G or Y. The relevant feature is differentiation of forms, in contrast with the undifferentiated character of scribble--wavy.

[Insert Example 3 here.]

4. Letter-like Units. These probably are closely related to *letter-like scribbles*, but they resemble manuscript letters (or, occasionally, separated cursive letters). The forms may resemble letters but they appear to be forms the child has created. Do not assign children's writing to this category, however, just because the child has formed real letters poorly. You may have evidence from the child's statements that s/he does not know what these "things" are. In the example shown, we did not have the child's statement about the letter-like forms, but two independent judges thought these were not letters but were letter-like forms. Elicit the child's explanation or labels whenever possible.

[Insert Example 4 here.]

5. Letters—random. The child writes with letters that appear to have been generated at random. In the example shown, there was no evidence that the child made any letter-sound correspondences between the letters and his message. These patterns would not appear in the English writing system, at least for words which the child would likely be exposed to.

[Insert Example 5 here.]

6. &
7. Letters—patterns and Letters—name elements. The child writes with letters that show repeated patterns. *Letters–patterns* are actually the same form as *Letters–name elements* but may include repeated letters (AAABBBCCCOPQMM) or patterns that approximate English spelling (MOVTIXREEMOOT or DABAGAWAWA). Example 6 shows elements repeated over and over.

[Insert Example 6 here.]

Examples 7a and 7b shown below are actually *name elements* and *patterns* mixed. In Example 7a, the AN and SU appeared to be elements from the child's last name, but the BO, RO, TO, and SO appeared to be repeated patterns. These patterns often are part of patterns of English spelling, but often they are repeated strings from the alphabet or other common strings. The brief part of Example 7b shows the child's first name patterns in the first two units and strings from the alphabet at the end.

[Insert Examples 7a and 7b here.]

8. Copying. Here the child will copy from environmental print in the room, on articles of clothing or school supplies, or seen out the window. In the example below, the child copied from a tape-recorder and a crayon box and then "read" a story about a different topic.

[Insert Example 8 here.]

9. Invented spelling—Syllabic. All invented spelling contains phonetic relationships between the sounds in the spoken words and the letters used to stand for those words. In *syllabic invented spelling*, the child uses only one letter per syllable, as shown in the example.

[Insert Example 9 here.]

10. Invented spelling—Intermediate. Just as the title implies, we are using *intermediate* to contain all the invented spelling between *syllabic and full*. In the example shown most of the spelling is *syllabic* but the words *pushed* and *myself* are *intermediate* (it is encoded in full).

[Insert Example 10 here.]

11. Invented spelling–Full. In *full invented spelling*, there is a letter for all or almost all of the sounds in the spoken word. The example that follows is almost totally *full invented spelling*, although it has a few conventionally spelled words (such as, *I'll* and *she*).

[Insert Example 11 here.]

12. Conventional. The child uses conventional *correct*, or dictionary spelling. See the conventional spelling in Example 11. The following example shows a child who wrote a list of conventional words when asked to write a story. This child's writing would be marked as *conventional*. If the child reread the *story* by reciting a story, the rereading would be marked in the appropriate box; but if the child read the list of words as, *at, cat, dog*, then the rereading would be marked *other*, since the rereading system is based upon the assumption of an attempt to create connected discourse.

[Insert Example 12 here.]

13. Other. Mark this box if the child uses a writing system that does not fit the descriptions above. Always describe this sytem by writing a note on the back with the child's name or number. Some of the less frequent systems include using abbreviations, rebus writing, and inventing a set of new symbols (code). (For brevity, no examples are included.)

Eyes on Print

We have added this set of categories to expand our assessment of rereading. We could add numerous other categories, including *use of the page space, directionality*, spacing, etc., but the *eyes on print* category is particularly important. We have not, however, attempted to make these judgments extremely precise.

They cannot be retrieved, however, from the audiotapes or from the children's written products, so on-the-spot observation is necessary.

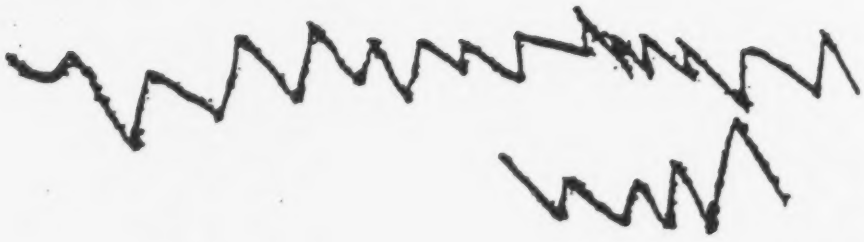
Mark *yes* if the child's eyes are on the printed page all of the rereading time; mark *no* if they are not on the page at all; and mark *occasional* if they are only occasionally on the page. You are not being asked to judge whether or not the child is actually tracking print, but you could add a note to that effect, if you wish. (If you marked *aspectual/strategy dependent* or *conventional* rereading, that means that the child was tracking print.)

We added the category pointing at pictures or marks for those instances in which the child is pointing and appears to be tracking but the print being tracked is drawing or non-linear units. (This would not be used for pointing at scribble.)

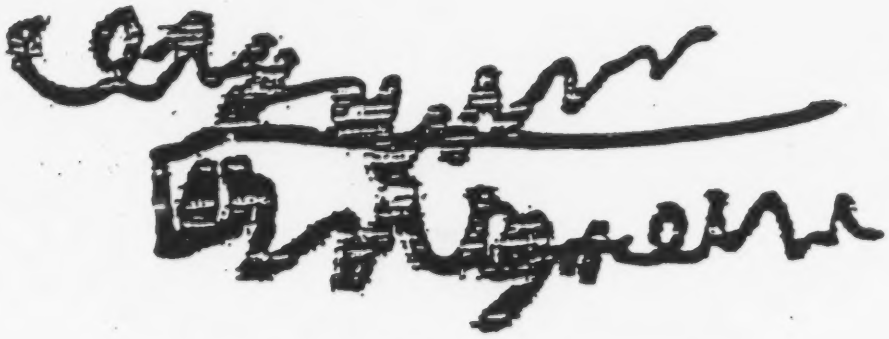
(Note: *Not observed* and *refusals* in rereading would imply that the *eyes on print* category could not be completed.)

Example 1

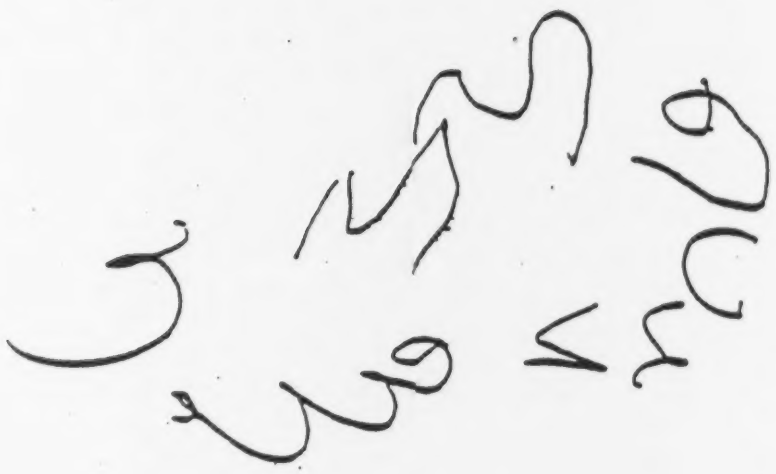
Example 2



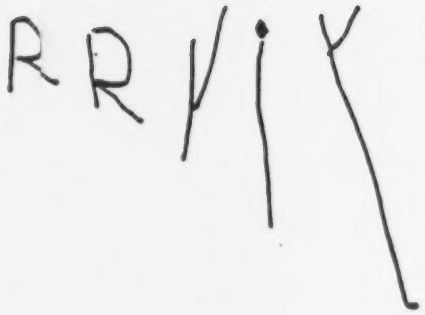
Example 3



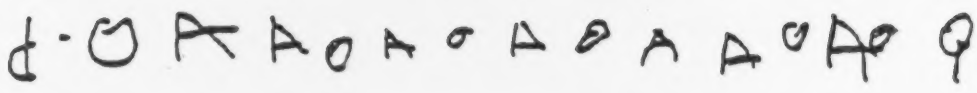
Example 4



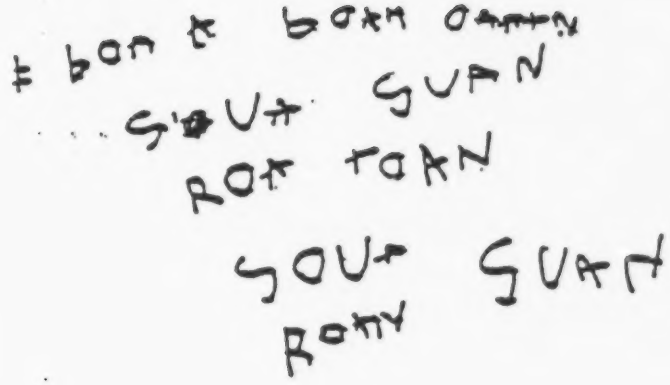
Example 5



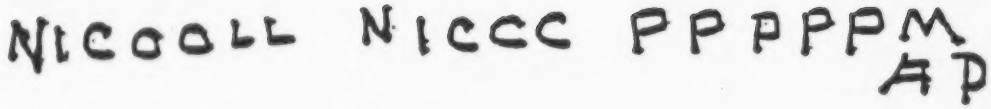
Example 6



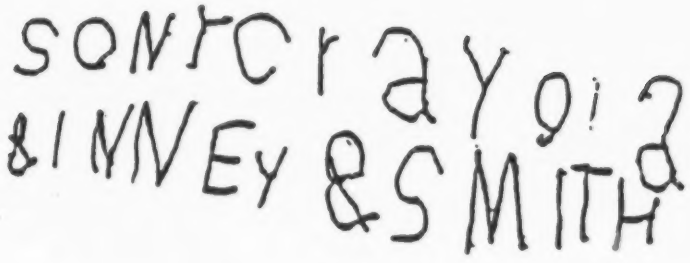
Example 7a



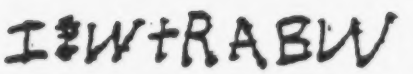
Example 7b



Example 8

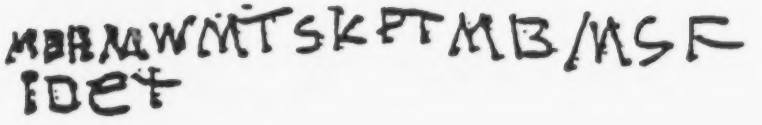


Example 9



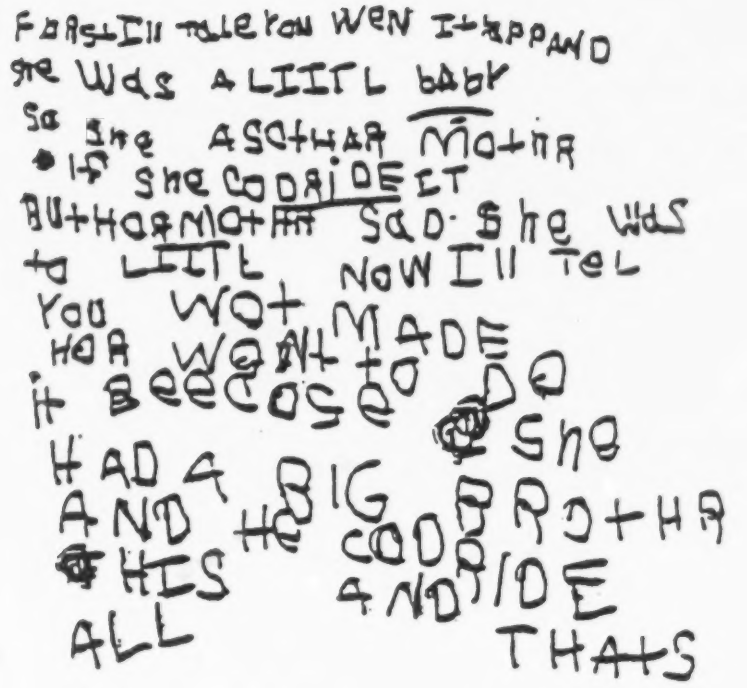
(I wanted to ride a big wheel.)

Example 10

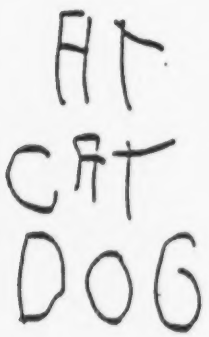


My dad helped me with my tricycle (TSK). He pushed (PT) me. [He let me do it] by (B) myself (MSF). I (1) did (D) it (IT).

Example 11



Example 12



SULZBY WRITING – READING CODING SHEET

____ of ____

DATA COLLECTION # _____
School Code: _____
Teacher Code: _____
Classroom: _____
Researcher: _____
Date: _____
Coder: _____

WRITING

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Drawing as Writing	Drawing as Illustration	Scribble - Wavy	Scribble - Letterlike	Letterlike Units	Letters - Random	Letters - Patterned	Letters - Name Elements	Copying (Env. Printing)	Invented Sp. - Syllabic	Invented Sp. - Intermediate	Invented Sp. - Full	Name	Conventional	Other

REREADING

S	1	2	3	4	5	6	7	8	9	10	11	12	13
Stability	Not Observed	Refusal	Dialogue	One Clause - Oral	One Clause - Written	Labelling - Descrip.	Oral Monologue	Oral - Written Mix	Written Monologue	Naming Letters	Aspectual / Strategic	Conventional	Other

EYES ON COMPOSITION

1	2	3	4	5
Yes	No	Occasional	Pointing to Pic./Marks	Other

Child's Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	S	1	2	3	4	5	6	7	8	9	10	11	12	13	1	2	3	4	5
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